MARINE REVIEW.

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A Cargo of 4,535 Tons of Coal.

Another cargo record has been broken, and now the steamer S. S. Curry, owned by the Hawgood and Avery Transit Company of Cleveland and built by F. W. Wheeler & Co. of West Bay City, Mich., leads all lake freight boats in the matter of big coal cargoes. She is now unloading at Gladstone, Mich., a cargo of 4,535 net tons of soft coal, taken on at Conneaut, O., last week. With 280 tons of fuel in addition to her cargo, the Curry was drawing 16 feet 9 inches. Of course, this does not represent the full capacity of this steamer, or in fact that of several other big lake boats that are limited by the draft of harbors and connecting rivers, and also by the extra fuel taken on at lower lake ports to meet requirements for almost the entire round trip, but it is the largest coal cargo ever carried on the lakes. It is 283 tons greater than the Selwyn Eddy's cargo of 4,252 tons of hard coal, recently loaded at Buffalo for Chicago.

A Serious View of the Chicago Drainage Project.

Editor MARINE REVIEW: May I, through your columns, ask some one in authority why the people of Chicago are permitted to open a channel from Lake Michigan to the Mississippi, having a depth and width equal to the "Soo" canal with a steady flow of water, when the United States government is, at the present time, spending millions in deepening the connecting channels of these lakes? It is said by those who are supposed to know that the level of the water on the lakes will not be lowered, but as the water shed on the lakes can not be enlarged, surely the slightest drain must affect the level, and such a constant drain as this new river must soon noticeably affect it.

The canal will undoubtedly be of great benefit to Chicago, but are the people at large willing to risk the lowering of these great avenues of trade, the lakes, by reason of this new river? Those possessed of the slightest common sense must see that unless there is some way to increase the inflow of water into these lakes, the level, in time, must be lowered.

Detroit, Mich., Aug. 31, 1894. RICHARD P. JOY.

Grain and Flour Shipments from Duluth and Superior.

According to semi-official reports there was shipped from Duluth and Superior during the crop year ending August 31, 1894, 8,674,191 barrels of flour, as against 5,459,174 barrels during the year ending August 31, 1893. This heavy movement of flour is, of course, due largely to the increase in the number of mills making flour at the head of Lake Superior. As compared with previous years the shipments of wheat from the head of the lakes show a marked falling off. This is due in part to the manufacture of wheat into flour at the new mills but more largely to the fact that in the crop year 1893-94 there was not the wheat to be moved. The output or make of flour in Duluth-Superior mills during the year just closed amounted to 2,671,889 barrels, against 1,607,616 barrels during the previous year. Following is a table giving the shipments of wheat, flour and corn:

DULUTH FLOUR AND GRAIN SHIPMENTS.

	Wheat, bushels.	Flour, barrels.	Corn, bushels.
Year ending August 31, 1894	23,425,028	*8,674,191	357,336
" " " 31, 1893	34,519,851	5,459,174	307,836
" " " 31, 1892	46,071,503	4,087,643	111,372

*Includes Superior shipments.

Iron Mining Matters.

A meeting of stockholders of the Chapin Mining Company, held in Milwaukee Monday, is the cause of more newspaper dispatches regarding the future of the mine and a rehearsal of the causes leading to the sale that is to occur next month. The stockholders decided to offer no opposition to the foreclosure suit, but this action is of no significance, as there was no cause for the meeting of stockholders, which was probably called by Trustee Flannigan simply on account of a desire on his part to proceed with the sale in the careful manner that has characterized his actions in all matters pertaining to the property since he took charge of it. The railway companies, which are among the principal holders of the bonds, can hardly be expected to go into the mining business, and it is more than probable that Mr. Chapin, owner of the fee, would allow the mine to fill up with water and remain in that condition for all time to come rather than undertake its operation on his own account, so that it may as well be regarded as a certainty that the mine will fall into the hands of M. A. Hanna & Co. of Cleveland, and a complete settlement with creditors will follow The Cleveland firm, with its iron ore sales business, ships and docks, and with the claims that it holds against the Chapin, is alone fitted to operate the mine under the prevailing prices in the ore trade, and the small army of workmen and their families, whose lives have been associated with the development and operation of the mine, have reason to feel thankful that circumstances leading to the sale have resulted in the prospective owners being in a position to save the property from entire loss. R. C. Flannigan, the attorney who has had charge of the Chapin as trustee for the bond-holders since the Schlesinger failure, was not well known to people interested in the Lake Superior mines previous to his appointment to this position, but he is highly regarded among all classes in the upper Michigan peninsula. His efforts last winter to keep the mine in operation were mainly directed toward the welfare of the workmen and their families, and it is understood that for all his labor in this regard he had not fixed upon any renumeration until it was suggested by certain of the boudholders that he ask the court, in the foreclosure proceeding, to fix a sum covering his fee.

Angus Smith of Milwaukee, president of the Aragon mine, who was compelled to take back the mine from Ferdinand Schlesinger after the latter's failure, caused a sale of delinquent stock at public auction in Milwaukee a few days ago. The shares offered were: Joseph G. Butler of Youngstown, O., 2,000 shares, assessment due, $4,000; William H. Osborn, Milwaukee, 2,000 shares, assessment, $4,000; Charles Himrod, Chicago, 1,125 shares, assessment, $2,500, and 2,000 shares of Joseph Butler, held by Angus Smith as collateral security. The stock was bought by M. A. Helmer of Milwaukee for other parties at $2.03 to $2.05 a share.

Stock piles at some of the leading Gogebic range mines are undoubtedly larger than it was thought they would be at this time. At the several Norrie properties, for instance, the amount still reported in stock is above 100,000 tons, while the surface ore at the Superior aggregates about 40,000 tons and that at the Ashland 25,000 tons.

During the recent period of advancing freight, shipments of ore from Ashland were materially reduced. For the week ending August 25, the movement from that port amounted to only 65,164 tons, against 88,032 for the week ending August 18, and 79,223 tons during the week ending August 11.

Cargo and Speed Records.—Lake Freight Steamers.

Iron ore.—Maritana, Minnesota Steamship Company of Cleveland, 4,260 gross or 4,771 net tons, Escanaba to South Chicago; Selwyn Eddy, Eddy Bros. of Bay City, Mich., 3,897 gross or 4,364 net tons, Escanaba to Ashtabula; S. S. Curry, Hawgood & Avery Transit Company of Cleveland, 3,852 gross or 4,314 net tons, Escanaba to Fairport; Kearsarge, Interlake Company of Cleveland, 3,718 gross or 4,164 net tons, Escanaba to Cleveland.

Grain.—Selwyn Eddy, Eddy Transportation Company of Bay City, 130,820 bushels of wheat, Detroit to Buffalo; Centurion, Hopkins Transportation Company of St. Clair, Mich., 147,812 bushels of corn, Chicago to Erie; Onoko, Minch estate of Cleveland, 187,657 bushels oats, Chicago to Buffalo.

Coal.—S. S. Curry, Hawgood and Avery Transit Company of Cleveland, 4,535 net tons bituminous, Conneaut to Gladstone; Selwyn Eddy, Eddy Bros. of Bay City, Mich., 4,252 net tons anthracite, Buffalo to Milwaukee.

Speed.—Owego, Union Line of Buffalo, Buffalo to Chicago, 889 miles, 45 hours and 16 minutes, 16.4 miles an hour.

Light-house illuminants that have been used in the United States, since the use of candles was discontinued, are fish oil to 1812, sperm oil to 1861, colza oil to 1865, lard oil to 1879. From 1880 to 1884, kerosene was gradually substituted for the lard oil. The highest price paid in any one year for oil was in 1875, $167,575 for lard oil; the least recently was in 1888, $10,490 for lard oil and $20,059 for mineral oil. The lowest price per gallon was 6¼ cents. The number of gallons of oil purchased in 1889 was 347,960. Gas has been tried. It is now used at three stations from city works. Compressed gas is used at ten lights, three gas buoys, and one lighted beacon. The use of electric light is as yet largely experimental.

PHOTOGRAPHS of sixteen lake steamers and two color plates will be mailed to any address for 50 cents. MARINE REVIEW, Cleveland, O,

Another Picture of the Sainte Marie.

Several pictures of the Mackinaw car ferries have been published of late, but that reproduced on this page from Cassier's Magazine, probably best illustrates the service in which these boats are engaged. The picture represents the Sainte Marie, the latest of the ferries built by the Detroit Dry Dock Company, in a big ice field at the Straits.

The Forerunner of Screw Steamers.

Some additional particulars of the Great Britain, the first screw steamer to cross the Atlantic, may prove interesting. She was begun in 1839 and floated in 1845, and was 322 feet over all, 50 feet extreme breadth and 32 feet depth, with a displacement of 3,618 tons at load draught of 18 feet. Not the least interesting of her many interesting features was her propelling machinery. The main crank shaft was of wrought-iron, seventeen feet long, its diameter at the middle part being 28 inches, and at the bearings, which were 30 inches long, 24 inches. Through this shaft, its cranks and crank pins, a hole was bored through which a stream of cold water was constantly injected to keep the main bearings cool. Upon this main shaft was keyed a toothed drum, a little over 18 feet in diameter at the pitch line and 38 inches wide, around which, and a smaller drum 6 feet in diameter, keyed on a shaft immediately below it, four sets of pitch chains worked, the operation of which was remarkably smooth and noiseless, accounted for by the fact that what served the purpose of teeth in both drums, were bars of teak wood in the larger, and lignum vitæ in the smaller, let into recesses in the rims of the former and the boss of the latter. The pair of direct-acting engines, with 88-inches by 6-foot stroke cylinders being intended to be driven at a maximum speed of 18 revolutions per minute, the drums were speeded to give nearly three revolutions of the screw shaft to one of the engine shafts. Engineering opinion as to the proposed application of pitch chains for the transmission of the power of the engines to the propellor shaft was at that time somewhat divided, there being no previous experience in that direction, but the results of their working during the preliminary trials and subsequent voyages of the ship amply proved their adaptability to the purpose, there being but one link of the number employed that ever showed signs of distress through strain. Looking back along the fifty years that have passed since the Great Britain was completed, it can be said, with little fear of contradiction, that, despite the great strides which have been made in the designing and building of high-speed vessels of large power and great tonnage, the principles of construction which have found their development in these structures were anticipated in this early ship.

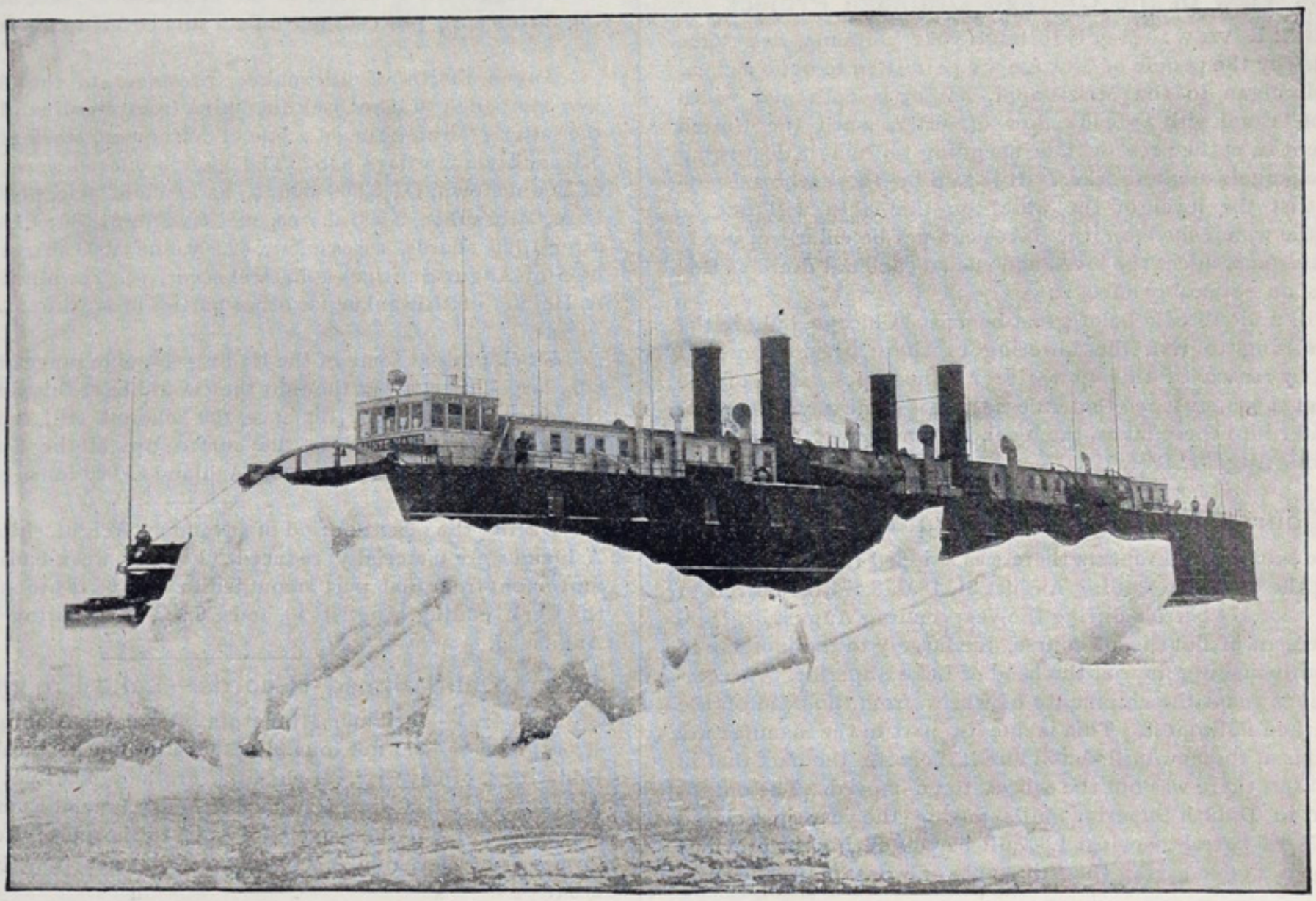
Directors of the Richelieu and Ontario Navigation Company are again talking of new passenger boats for the St. Lawrence.

A Single Year's Production of Bessemer Steel.

The venerable Sir Henry Bessemer has been writing of the great industry that bears his name. In 1892 the acid and basic steel that went into rails, ships, forgings, castings, etc., in Europe and America amounted to not less than 10,500,000 tons, valued at $420,000,000. Object lessons best convey an idea of the enormous bulk of matter represented by so many tons of steel. This great mass would form 1,672 great columns or towers of steel each 20 feet in diameter and 100 feet high. If placed side by side in a straight line and in contact with each other, these great columns would extend a distance of six miles. Or again, imagine a straight wall 100 miles in length, 5 feet in thickness and 20 feet in height. Such a wall would stand on 60½ acres of land. But suppose that this wall, like a gigantic armor plate, was formed into a circle and used to surround London, it would form a circular inclosure of 31¾ miles in diameter and would embrace an area of 795 square miles. This wall of London would just be equal to a single year's production of Bessemer steel.

A Niagara Falls Problem.

At the recent meeting of the American Association for the Advancement of Science, a week was given to problems connected with the drainage of the great lakes, and incidentally with the probable age of the gorge of Niagara. The conclusion arrived at was that while the lower lakes may have always been drained through the valley of the St. Lawrence, the upper lakes had probably found an outlet at one time by the way of the Mississippi valley; and that the whole chain might do so again, should there ever be a barrier, natural or artificial, across the inlet of the Niagara near Buffalo. It was thought that a dam 25 feet high might bring about this result and cause a grander river than any now on the continent to flow out from Lake Michigan near the city of Chicago. As to the range of the Niagara gorge, the conclusion was that 7,500 years met all requirements; while a few deeemed 3,500 sufficient. As the age of Niagara has been regarded as a kind of geological yardstick for measuring off the age of the human race, importance was attached to the foregoing conclusions. Geologists, however, have since then been making further studies of the problems indicated. And while some of them adhere to the ground just stated, others materially modify their opinions.



BY PERMISSION OF CASSIER'S MAGAZINE. NEW YORK.

CAR FERRY SAINTE MARIE IN THE STRAITS OF MACKINAC.

Hearings in numerous cases brought against Chicago tug owners by city authorities who are endeavoring to overcome the smoke nuisance have again been postponed. The smoke inspector's experiments with crude oil on a tug chartered for experimental purposes have not, it is claimed, proved satisfactory enough to warrant the city in making a case on the ground that oil may be substituted for soft coal.

Boiler Question on the North West.

Some very serious questions are evidently receiving attention from the Northern Steamship Company in advance of ordering a resumption of work on the second big passenger steamer, the North Land, on which practically no work has been done since the North West was launched. If the second boat is to go into commission next summer, it would seem that work must be resumed soon, but there has been no notice to that effect as yet, and the officers of the Globe company say that they are simply awaiting orders from the owners to go ahead with a duplicate of the North West or to make any changes in machinery or boilers that may be desired.

Although little information has been given out regarding the operation of the North West, the boiler question is undoubtedly the cause of delay in ordering a completion of the second boat. Feed pumps for the North West's boilers were constructed in New York from designs of the patentees, Delauney, Belleville & Co. of France, and they have proved unsuccessful, so much so that new pumps designed by Mr. Richard Peck, who has been in charge of the boat's machinery since she went into commission, are now being constructed at the works of the Globe company. They will not, however, be finished in time to be used during the regular runs of the North West this season, and it would seem, therefore, that if they are to overcome the difficulties connected with using lake water in the Belleville boilers, the fact will not be determined early enough to settle the boiler question for the second boat and insure her completion for business early next season. It has been an open secret that the principals of the Globe company, builders of the boats, were not as enthusiastic over the adoption of Belleville boilers as was Mr. Miers Coryell, who represented the Belleville company in this country, and who was instigative, when engaged by the owners of the North West, in having the boilers adopted. Mr. Coryell is now in England and will not be connected with the work of completing the North Land, so that there is reason to question whether tubulous boilers will be applied to this second boat.

As bearing on the comment attending this question, engineers will be interested in referring to the August 23 issue of the REVIEW, which contains a description and report of trial of the International Navigation Company's steamship Kensington, built on the Clyde, and which is fitted with twin quadruple engines and Scotch boilers. Although the largest steamship in the world,—10,600 tons cargo and 120 cabin passenger capacity,—the cylinder diameters of the Kensington's engines are almost identical with those of the North West, as shown by the following comparison:

	North West.	Kensington.
High pressure,	25 inches.	25½ inches.
First intermediate,	36 "	37½ "
Second "	51½ "	52½ "
Low pressure,	74 "	74 "
Stroke of piston,	42 "	54 "

At a series of trials on the measured mile the Kensington's engines developed 8,313 horse power and drove the big hull—12,400 tons displacement—at a mean speed of 15.8 knots or 18.2 miles an hour. The Kensington has three boilers of ordinary size but adapted for a working pressure of 200 pounds to the square inch and having in connection the Ellis-Eaves system of induced draft.

This comparsion is made simply for the reason that in these two big ships—North West and Kensington—both fitted with quadruple engines of about the same size, but one having Belleville tubulous boilers and the other boilers of the ordinary type with induced draft, there seems to be a basis for considerable practical study. In the issue referred to, more complete data than that noted here will be found regarding the engines and boilers of the Kensington.

Collecting Information about Steel Ships on the Lakes.

Although it is not generally known outside of the Buffalo and Chicago offices of the principal agents of insurance companies that have been doing a regular business on the lakes for a number of years, these home underwriters have of late been collecting a vast amount of information regarding steel ships that will eventually prove of great value to them in competing with English underwriters who have taken a large share of the steel risks through New York brokers. It is, of course, well known that of the fleet of about 126 steel steamers on the lakes some are very much inferior to others, the most substantial being those completed within the past year. In order, then, to be in a position to meet, on the best class of risks, the low rates established by the so-called system of underground insurance, through which the ore companies and the package freight lines of Buffalo have insured their boats in England, the lake agents have had Capt. F. D. Herriman of Chicago constantly engaged in survey work, and one of the leading agents of Chicago said, a few days ago, that they are now in possession of reports covering all details regarding the hulls of every one of the 126 steel boats on the lakes. Similar surveys relative to machinery are also being made, and on a large number of the steamers the information they have collected is as complete as that obtained by Lloyds for a boat classed by that institution.

In the case of all new boats the survey for these home agents is made in a manner that would seem almost as complete as that of the classification societies, although without charge to either owner or builder. It is withheld as the property of the agents, however, and it will be noted that although the work has been going on for some time past nothing has appeared in the Inland Lloyds Register to indicate the conclusions of the agents regarding the structural qualities of any of the steel boats. But with a complete collection of surveys they evidently hope to be in a better position to pass upon steel risks than the foreign underwriters who are dependent upon such surveys as have been made by the classification societies. A single report of survey, according to the system now established by the home agents covers several large pages of printed form and goes into every detail of scantlings, plating, riveting and even pumps in the machinery department.

Around the Lakes.

Secretary C. H. Keep of the Lake Carriers Association has returned from his European trip.

Dr. E. E. Beeman and George Worthington of Cleveland have purchased a large sailing yacht in New York and will bring her to the lakes.

Capt. Alex. McDougall is about to start for Everett, Wash., to arrange for a resumption of work on the whaleback on the stocks at the Pacific coast yard.

E. W. Heath of St. Joseph, Mich., will build for W. Singer of Duluth a wooden tug that is to be 95 feet long and 20 feet beam. The boat will be used for towing rafts.

Pelsford Boutin has been transferred from the Sturgeon bay life saving station and appointed keeper of the Milwaukee station, to succeed J. F. Pratton, whose resignation was requested.

After dragging thirty-six square miles of lake bottom near Dunkirk, Lake Erie, Detroit wreckers, who tried to find the wreck of the steamer Dean Richmond, which foundered in October last, have given up the search.

Capt. John W. Keith, who was engaged in sailing lake vessels away back in the forties, died at his home in Detroit last week. The death of Capt. Luther Fox, another retired vessel master is announced from Lorain.

Engineer-in-Chief John W. Collins, First Lieut. John Dennett and Chief Engineer Daniel C. Chester comprise the board of revenue marine officers oppointed to conduct the official trial of the revenue cutter Calumet, to be held at Buffalo about the 10th inst.

Mr. F. W. Wheeler of West Bay City says there is no truth in the report that his firm has closed a contract for a big steel steamer. Negotiations are under way for some new work, but no contracts have been secured. Capt. James Davidson also says that he has not fixed upon any new work as yet.

Lumber shipments from Bay City during August were about 5,000,000 feet greater than during the same month last year. The total was 21,366,870 feet in addition to 1,850,000 packages of shingles. Receipts of lumber at Bay City during the month from Duluth amounted to 3,140,000 feet and from Cheboygan 503,500 feet.

As had been expected, the grounding of the big passenger steamer North West at Bar Point on Wednesday last was not a serious matter. She drifted out of the channel on account of trouble with her wheel chains and was readily released a few honrs later by a rise of water and assistance from the Grummond tug Champion.

Two small steam craft, the Massassango of Erie and the Wilber of Chicago, were recorded last week among vessels of the United States in the office of the commissioner of navigation. The Massassango is 119.45 tons gross and 77.99 net and the Wilber 13.51 gross and 9.99 net, and their official numbers are 92,606 and 81,487 respectively.

Only one new vessel, the Minnie Kelton, built by F. W. Wheeler & Co. and owned by Capt Beggs and others of Bay City, is classed in the September supplement of the Inland Lloyds Register. The Kelton is given an A 1* rating and is valued at $50,000. She is a lumber carrier, and will be sailed by Capt. Beggs, who was on the steamer Doty last season.

Shipments of anthracite coal out of Buffalo to all upper lake ports during August exceeded the shipments during the same month last year by 1,043 tons. The total of shipments to Sept. 1 is 1,299,067 tons, against 1,440,070 tons on the same date in 1893. Thus the movement of anthracite so far is but 41,003 tons less than it was at this time last year, and little may be expected from freights in that line.

AN EXCELLENT LIBRARY FOR A MARINE ENGINEER, CHEAP—KEY TO ENGINEERING; WHAT AN ENGINEER SHOULD KNOW ABOUT ELECTRICITY; ENGINEERS' CATECHISM. ANY ONE OF THESE ARE WORTH A DOLLAR, BUT ALL THREE CAN BE HAD FOR $1. SEND TO THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING, CLEVELAND, O. MONEY REFUNDED IF NOT SATISFACTORY.

Handling Coal by the Car Load.

A FULL DESCRIPTION OF THE M'MYLER CAR DUMPING MACHINE IN OPERATION AT ASHTABULA HARBOR—INTRODUCTION OF A SUCCESSFUL METHOD FOR RAPID HANDLING OF SOFT COAL.

In a two-page supplement accompanying this issue of the REVIEW, views of the McMyler car dumping machine are presented. The picture also shows, to a large extent, in the broad area of docks that it covers, the improvements that have been made at Ashtabula Harbor within a few years for the storage and rapid handling of both ore and coal.

Next to the traffic in iron ore between the mining regions of Lake Superior and the furnace districts of Illinois, Ohio and Pennsylvania, the movement of bituminous coal from Lake Erie ports to the northwest is the most important item of lake commerce. For several years past shipments of coal from the Pittsburg, Hocking Valley and West Virginia districts have averaged about 3,000,000 tons each season. This coal is of a high grade, suitable for fuel and steam purposes and for the manufacture of gas and coke,and shippers have tried various methods of loading it into vessels without damage from breakage.

As far back as twenty years ago attempts were made to handle coal on the lakes by means of shutes, and on the Cleveland docks of what is now the Big Four railway, as much as $65,000 was expended on a single plant that had to be entirely abandoned soon afterward, on account of damage to the coal in handling it. With the advent of big steel steamers and wooden boats of largely increased capacity, rotary derricks, handling first buckets of ordinary size, and later on buckets of five tons capacity, were introduced into the trade, but even with these, the largest vessels were delayed two to four days in loading, and with eight or ten men shoveling into buckets from a car three feet deep, and not taking probably more twenty pounds to a shovelful, there was still the disadvantage of separation in the coal and consequent breakage.

The effort therefore, has been to secure dispatch for vessels approaching that obtained in the ore trade, where ships of 3,000 to 3,500 tons are loaded in a few hours, and at the same time avoid loss in the commercial value of the coal by overcoming, as far as possible, the breakage referred to.

From an engineering standpoint the machine is a very novel affair,but it has been given sufficient trial in active service at Ashtabula,to demonstrate its practicability and to warrant the statement that it will within another season revolutionize the handling of coal on the lakes. Patents on the machine are controlled by the McMyler Car Dumping Machine Company, a new corporation, and the first of them was built by the McMyler Manufacturing Company for Pickands, Mather & Co., who are the Cleveland representatives of the Minnesota Iron Company, and who conduct a larger business in iron ore, pig iron and coal than any of the several Cleveland firms that are engaged extensively in these associated industries. Instead of the old system of derricks and buckets, this machine takes up a loaded car of about twenty-three tons capacity and dumps its contents into the hold of a vessel in a manner that avoids practically any fall of the coal, as the car is lowered to the mouth of the hatch and the entire load allowed to slide out in a concentrated mass through an ingeniously arranged shute. Of course, a car of fifty tons capacity could be handled in the same way and the efficiency of the machine thereby greatly increased. Several records as high as fifteen cars of twenty-three tons each—345 tons—unloaded in one hour, have been made with the apparatus, and steamers, ranging in capacity from 2,000 to 3,500 tons, have been loaded in eight to twelve hours.

The machine is entirely self contained and portable, having the rotable features of a revolving derrick, with the addition of the girder or bridge, by means of which the entire car of coal instead of a loaded bucket is taken up and discharged. All trestle work is avoided and there is nothing complicated or expensive about the apparatus. Aside from the machine itself the only expense is that connected with arrangement of the surface railway tracks.

Viewing the machine from a mechanical standpoint, its elements may be described as a bridge of two plate girders turning on trunnions near the river or dock end of the bridge. These trunnions are carried on the frame work of the house, which is in turn carried on about 100 twelve-inch wheels arranged in a circle after the manner of a draw bridge. The circular track on which these wheels move is supported through heavy plate girder frame-work by sixteen large car wheels moving on four tracks, the outer ones of which are twenty-four feet apart. Back of the machine and its docks are six double lines of railway tracks, which are for loaded and unloaded cars, and which are spaced about the same as the hatches of vessels and perpendicular to the line of the dock. The power is furnished by a pair of suitable engines, which control the hydraulic power, and all operating parts are controlled by friction clutches, requiring but one operator to handle the entire machine and only four men in all engaged in connection with the plant. The other three are a fireman, a man employed on the bridge and a man to attach the cable to the draw head of the car.

A hydraulic ram of 18¾ inches diameter, mounted on trunnions, tilts the bridge, which is so balanced that it rights itself, the ram forming an effective brake for it. From an accumulator, having at one end a hydraulic piston and at the other a steam piston ten times the area of the hydraulic piston, is taken the pressure to operate the clutches for pumping, hoisting and driving laterally, and also the brake controlling the winding drum that pulls the car up the incline.

In operation, the vessel being placed so that the hatches are opposite the tracks, or nearly so, the machine is moved to the hatch, which it is desired to load into; the steel cable, size 1¼ inches, is hooked into the draw head of the car and the car pulled up to the upper or shorter end of the bridge, which is so constructed as to form a bumper, against which the end of the car rests when tilted. The end board being withdrawn automatically through the tilting operation, the coal flows out through a discharging shute, and is concentrated in a telescopic trough or spout, which, at the first flow of coal, may be lowered to within a few feet of the bottom of the vessel, when the work of loading begins at any of the several hatches, or to the surface of the coal itself after the bottom of the vessel is covered. In double-decked vessels this shute may be lowered to the between-deck combings. After the load is discharged, the bridge is tilted back, the cable on the end board detached, the car allowed to run down and off the incline onto the track provided for "empties," a loaded car again taken up, and so the the operation continues, the machine moving from one set of tracks to another and from one hatch to another as may be required by supplies of loaded cars, or in permitting of trimming of cargo. Through this latter operation a great saving of time is gained, as occasion for shifting a vessel while the work of loading goes on is very rare. Not only can the machine be moved laterally in either direction with a car on the bridge or platform, but it may be swung at the same time to avoid spars or any other obstructions on the vessel. One of the best features of the machine is its adaptability to the kind of railway car in general use in the bituminous coal trade. The only charge required is that of fitting sliding end boards in the cars at a trifling cost. Immediately upon preparations being made for the erection of this first machine at Ashtabula, the management of the Lake Shore and Pittsburg & Lake Erie railways, the two coal lines running into that port, caused 1,000 cars to be fitted with sliding end boards and work has been started on 1,000 more of the same kind.

The capacity of the surface track plant shown in the large engraving, and from which cars are moved onto the platform of the machine by a locomotive constantly in attendance, is 140 cars, or about 3,300 tons. Of course, the number of sets of surface tracks for loaded and unloaded cars, depends entirely upon the number of cars it is desired the plant shall handle, and as the entire transferring apparatus is arranged to move along a dock line it can therefore be made to accommodate any desired number of tracks and length of dock.

The work done by the machine during the few weeks that it has been in actual service is shown by the following table, in the consideration of which, especially as regards the first cargoes loaded, allowance must be made for the usual difficulties attending the handling of new machinery:

DATE.	NAME OF VESSEL.	TONS LOADED.	TIME LOADING.
June 27	Str. Maruba	1145 tons	8 hrs. 45 min.
29	" Yuma	1319	8 45
July 2	" Iosco	2180	13 45
6	" Matoa	1238	5 30
6	" M. M. Drake	1535	13 30
7	" Maryland	537	3
16	" R. J. Hackett	1091	11 45
17	" Choctaw	2195	12 30
18	" Kearsarge	3088	21 45
20	" Maryland	2846	16 30
26	Schr. Allegheny	1062	6 20
27	Str. Pontiac	2466	11 45
29	" Maritana	2497	10 30
31	" Kearsarge	3283	16 15
Aug. 1	" Choctaw	2228	8 15
2	" Pease	780	8 30
3	" Manola	1421	5 30
5	" Matoa	2511	10
7	" J. C. Gilchrist	1988	9 45
8	" Yuma	3259	12
9	" Manhattan	1858	8 45
10	" Wadena	1794	10 15
11	" Kearsarge	3226	12
13	" Manola	2573	9 45
14	" W. H. Gratwick	1789	7
15	" John Mitchell	2187	9 30
	Totals	52096	271 50
Aug. 21	Str. Manchester	2120 tons	8 hrs. 30 min
21	" Neshoto	1854	7
22	" Kearsarge	3724	13 20
	Totals	7698	28 50
	Grand totals	59794 tons	300 hrs. 40 min

Steel Steamship Harvey H. Brown.

REPORT OF EXPERIMENTAL TRIP—MODERN COARSE FREIGHT STEAMER BUILT BY DETROIT DRY DOCK COMPANY AND OWNED BY NORTHWESTERN TRANSPORTATION COMPANY, DETROIT, MICH.—AUGUST, 1894.

Test and report by Geo. C. Shepard, Cleveland, O.

[Continued from Vol. X. No. 9]

An interesting feature in the machinery of this ship is found in the system of hot draft in use thereon, and the following table is a resume of the data of this feature for each test, and also for a special test with the fan shut off, and with the fan running at different rates of speed:

Number of Tests.	Retarders.	Revolutions of fan.	Temperatures.		Air Pressure.		
			Furnace.	Uptake.	Fan.	Furnace.	Uptake.
1	Out	431	273	597	2.9	.4	1/8
2	Out	420	223	622	2.77	.41	.2125
3	In	418	182.5	470	2.75	.52	3/16
4	In	460	189	520	3.2	.7	1/8
5	In	431	167	487	2.88	.55	5/32
6	In	415	186	471	2.7	.52	3/16
7	Out	0	0	425	0	.0	1/8
7	Out	467	237	570	3.4	.75	3/16
7	Out	427	238	560	2.8	.55	3/16
7	Out	382	238	545	2.2	.45	3/16

During the fifteen minutes that the fan was stopped, and the attempt was made to run with natural draft, with the ash pit doors open, the steam pressure dropped from 155 to 120 pounds, and in twenty minutes from the time the fan was started again, the gage was back to 155 pounds.

The air supplying the fan was drawn through the engine room and mostly through the skylight immediately above the cylinders, and to this may possibly be attributed the fact that it was impossible to get indicator cards from the H. P. cylinder without the interference of water in the indicator.

A noticeable feature was the efficiency of the condenser and air pump, and by which, when running at half speed, a vacuum of 28 inches could be obtained, and 26 inches at full speed, and a good vacuum could be maintained after the engines were stopped, rendering them easy of manipulation in port.

Before leaving the lower port for this trip, 163⅗ net tons of freshly mined "Essen" lump coal, from near Pittsburgh, Pa., was put aboard for fuel, and the total consumption for the round trip was not over 168 tons. The amount of ashes in the coal, deduced from several tests, was 11 per cent of the coal.

The water supply of the feed-water heater was taken from the sea cock, and its temperature raised about 100°; but were the piping so arranged that the supply could have been taken from the hot well, the temperature of which was only 6 or 7° below that of the feed-water, the temperature of the feed-water could have been made 30° higher than it was.

It was desirable to make a test with the main engines only on the main boilers, the auxilliaries taking their supply from the donkey boiler. This failed for lack of sufficient steam from the donkey boiler, and it was also rendered impossible, by the manner of piping, to take steam for any one auxilliary from this source, without shutting all the others from the main boilers. At the time of the only opportunity for testing the auxilliaries separate from the main engines, the fan was undergoing repairs and the fires in the furnace banked, but it is seriously questioned whether running such a light load on such a large boiler would not have made the apparent cost of the power excessive under these circumstances.

On account of the short duration of test No. 4, the results concerning the consumption of coal can not be considered strictly reliable. The test was concluded earlier than we anticipated at the outset, at the request of the officers of the ship, since the extra power and speed caused an objectionable vibration of the ship; similar vibrations of the same period, seventy-eight per minute, were also noticed in passing through water about six fathoms deep. In more shallow water or in deeper water this was not the case.

The method of making the coal tests was to start on weighed coal after the fires had been cleaned, noting the time of putting the first shovelful of the weighed coal on the fires, for the beginning of the test, continuing the firing of weighed coal as long as desirable, and then noting the time of putting on the first shovelful of the unweighed coal, for the end of the test. Fires were cleaned every six hours and the tests generally ran through one cleaning.

The assistance in making observations and weighing coal, furnished by three men engaged for that purpose, was most satisfactory, and the aid and opportunities furnished by the officers and engineers were all that could be desired.

The bill of lading called for 3,046 gross tons of cargo, but 1 per cent. had been deducted from the actual weight for moisture, making the actual weight 3,078.8 gross tons or 3,448¼ net tons. Also, had the ship not been sheathed with wood, the weight of the wood, 150 net tons, might be added to the cargo without increasing the displacement of the ship, and making the cost per ton cargo per mile, 4 per cent. less.

Four sets of indicator cards, Nos. 14, 17, 19 and 26, taken during tests Nos. 3, 4, 5 and 6 respectively, have been expanded, all to the same scale of volume and pressure, and coincident with the expansion curve of the H. P. diagram, an isothermal curve has been drawn. To the mean effective pressure of all the cards has been applied the correction for the springs, and gage readings are also corrected.

The main engine was in excellent condition as regards the absence of leakage of any kind, and was very quiet in operation. The main boilers were clean internally and showed no leakage.

The mean result of the data taken from the calorimeter during each test made, in each case: 4.8 per cent. moisture in the steam.

I have not, in this brief report, attempted to develop all the facts that the data obtained present, but only the important ones. Among the interesting features to be solved are those relating to the uniformity of crank effort and the operative cost of the auxiliaries. I have drawn no conclusions as to the efficiency of the different parts taken separately or as a whole, and have left the suggestions for improvement, such as might be derived from close analysis of the results, to yourselves.

In General.

Russian courts have reversed the assumption of the American tribunals that when a husband and wife are drowned in the same disaster, the wife dies first. The Russian doctors have testified unanimously that the man would be the first to die, because a woman is more agile and keeps herself longer above water.

Canada's new revenue cutter Aberdeen, intendend for protection of coast fisheries, and which has been under construction for some time past at the ship yard of Messrs. Fleming and Ferguson, Paisley, Scotland, will soon be turned over to the dominion government. She has quadruple engines and water tube boilers and developed on trial a speed of a little more than 13 knots.

Another fool-hardy sailor who undertook to cross the Atlantic alone in a small boat has probably lost his life. A steamer arriving in New York, a few days ago, reports having passed a wreck that answers the description of the little schooner-rigged boat Nina, in which Capt. A. Freitsch, the Norwegian adventurer from Milwaukee, left New York several weeks ago after a coasting trip from port to port down the lakes.

The British government is testing a new plan for signalling at sea. It consists merely of an ordinary gong fastened to the bow of the ship below the water line. This acts as a transmitter, and the receivers are gongs of exactly similar tone and rate of vibration, one on each side of the ship below the water line. The receiving gong will take up and reproduce the sound of the sending gong from a long distance. Signals already have been clearly transmitted ten miles.

On six consecutive runs over the measured mile, with and against the tide, the torpedo boat destroyer Decoy, one of the latest of the big fleet of this type of war vessel being built for the British government, attained a mean speed of 27.641 knots. During the three consecutive hours of full speed steaming the mean speed attained was 27.77 knots, and the indicated horse power developed by the engines 3,900. The Decoy is a sistership of the Daring, the fastest of these boats, and was built by John J. Thornycroft & Co. of Chiswick, England.

About 3,600 miles were covered in the trip of the new torpedo boat Ericsson from Dubuque, Iowa, where she was constructed, to Long Island sound, the place of trial. The route was down the Mississippi river to the Gulf of Mexico, touching at Pensacola; thence to Key West, Fla., and up the coast by the open sea to Charleston, S. C., from which port she went to New York and continued on her way to New London, near which place she will have her speed trial—it is expected this week. The trial will take place over a 24-knot course, and the boat will be run two consecutive hours. For every knot over 24 knots she makes on her speed trial she will earn $20,000 for her builders.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stock of wheat and corn in store at the principal points of accumulation on the lakes on Sept. 1, 1894:

	Wheat, bu.	Corn, bu.
Chicago	25,385,000	1,401,000
Duluth	3,114,000	.....
Milwaukee	718,000	.....
Detroit	1,472,000	5,000
Toledo	3,082,000	15,000
Buffalo	1,378,000	100,000
Total	35,149,000	1,521,000

At the points named there is a net increase for the week of 1,725,000 bushels of wheat, and 91,000 bushels of corn.

MARINE REVIEW.

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O.

SUBSCRIPTION—$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,761 vessels, of 1,261,067.22 gross tons register in the lake trade. The lakes have more steam vessels of 1,000 to 2,500 tons than the combined ownership of this class of vessels in all other sections of the country. The number of steam vessels of 1,000 to 2,500 tons on the lakes on June 30, 1893, was 318 and their aggregate gross tonnage 525,778.57; in all other parts of the country the number of this class of vessels was, on the same date, 211 and their gross tonnage 314,016.65. The classification of the entire lake fleet on June 30, 1893, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels	1,731	828,702.29
Sailing vessels	1,205	317,789.37
Canal boats	743	76,843.57
Barges	82	37,731.99
Total	3,761	1,261,067.22

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

	Number.	Net Tonnage.
1889	225	107,080.30
1890	218	108,515.00
1891	204	111,856.45
1892	169	45,168.98
1893	175	99,271.24
Total	991	471,891.97

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

	St. Mary's Falls Canal.			Suez Canal.		
	1893.	1892.	1891.	1893.	1892.	1891.
No. vessel passages	12,008	12,580	10,191	3,341	3,559	4,207
Ton'ge, net regist'd	9,849,754	10,647,203	8,400,685	7,659,068	7,712,028	8,698,777
Days of Navigation	219	223	225	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

C. H. WESTCOTT, supervising inspector of steam vessels in Detroit, discusses in a public interview the communication of A. E. Cooley, Esq. of Bay City, in the last issue of the REVIEW, regarding the neglect of many captains of vessels on the lakes to answer passing signals. In addition to the penalty attending conviction in the United States courts for violation of the law covering passing signals, the steamboat inspectors are empowered to revoke the license of any officer convicted of such offense. Mr. Westcott is of the opinion that violation of the law is so common as to warrant the treasury department in making special efforts to locate the offenders, and says that he will give prompt attention in his capacity as inspector to any reports made to him. Would it not be well for some careful masters who know of violations of the law to give Mr. Westcott or some others among the inspectors an opportunity to show how far they will go in putting a stop to this negligence.

A NAVAL officer who has been on the lakes during the past week, and who is well informed regarding department matters in Washington, says that leading navy officials have expressed a desire to see lake ship yards compete for the building of the three torpedo boats, for which an appropriation has been secured in the last naval act. The question of treaty relations with Great Britain regarding the construction or maintenance of war vessels on the lakes would undoubtedly be again raised in event of an attempt to award such a contract to a lake ship yard, but with a successful bid and the support of the navy department there is a possibility of technicalities being overruled in this case. It would seem that this question of being barred from undertaking naval work of any kind is worthy of united action on the part of lake ship builders. Let a meeting be held and the subject submitted to the navy department in proper form.

Now that contracts are being let for constructing a part of the Hennepin canal, and with the Chicago drainage canal well under way, a few people interested in lake commerce are wondering why the subject of a lower water level on the lakes as a result of these projects has not been given more serious thought. In a communication elsewhere, Mr. Richard P. Joy of Detroit directs attention to this matter. That there is some reality in the Hennepin canal project there can now be no doubt. Contracts for the four-mile section, let several days ago, have been approved by the war department. The second four miles will be let late this month and the third four-mile section early in December.

WITH the completion of the two light-house tenders for which appropriations were made by the last congress, the light-house service of the United States will have thirty-two steamers and two sailing vessels engaged in the construction and maintenance of aids to navigation. This is irrespective of thirty-four light-ships also employed in the service. The two new steamers—one for the lakes and the other for the New England coast—are to be the finest in the service, as they are to cost $175,000 each, although only $70,000 for each has as yet been appropriated.

"THE proposed Lake Erie ship-canal between the Ohio river and the lakes looks a little nearer practical materialization" says one of the New York papers. Yes, about as much so as the Keeley motor and various other chimercial projects wildly conceived in the minds of impractical people. But the writer of news paragraphs several hundred miles distant from the lakes is not to be blamed for error of this kind, when senators and representatives from lake states will permit of appropriations being secured for surveys attending such canal schemes.

Fog Signals.

The Siren, invented by Cagniad de la Tour, was adapted to use as a fog signal by A. and F. Brown of New York under the direction of Prof. Henry. A first-class fog-siren has a trumpet like the Daboll trumpet. The sound is made by driving steam through radial slits in a fixed and a rapidly revolving disk placed in the throat of the trumpet. There are twelve radial slits in each disk, and the moving disk revolves 2,400 times in a minute, thus producing 480 vibrations per second. A pressure of fifty pounds of steam is required, and under the most favorable circumstances the first-class siren can be heard at a distance of from twenty to thirty miles. It is made in various sizes. A self-acting siren, made by the same firm, is not so expensive and nearly as effective. It requires no engine, as the steam itself revolves the disks.

A Crosby signal, a clockwork device, gives the characteristic automatically, and automatically winds up each time the siren blows. One of them, in duplicate, is at Execution Rocks light station on Long Island sound, and cost $925 without boilers. A first-class siren, in duplicate, without boilers, costs $4,800. The light-house board has bought the patent on the Crosby signal. Experiments have been made with a smaller siren, costing about $500, and consisting of a hot air engine and a centrifugal blower.

From the results of experiments made by General Duane, the power of the first-class siren, the 12-inch steam whistle and the first-class Daboll trumpet were expressed thus: Siren, 9; whistle, 7; trumpet, 4; but the relative expenditure of fuel, siren, 9; whistle 3; trumpet, 1; and the relative economy of fuel, siren, 1; whistle, 2⅓; and trumpet, 4. Length of blast and varying intervals between blasts in these three kinds of fog-signals indicate to the mariner the location of the fog signal he hears. The ninety steam and hot air fog signals of the United States have cost about $7,500 each, and the yearly expenses of maintaining them is about $1,250 each.

As has been said, the sound of the fog signals is subject to aberrations not easy to explain, so that they may be heard loudly where we would expect them to be heard faintly, and heard faintly, or not at all, where we would expect them to be heard loudly. It seems proved that the mariner approaching a fog signal from the windward, should go aloft, and when approaching from the leeward, he should go as near the surface of the water as possible, to pick up the sound of a fog signal most quickly. The mariner should not judge his distance from a fog signal by the intensity of the sound.—Cassier's.

Miscellaneous Mention.

Tonnage of New York state canals from the opening of navigation to Sept. 1, for the past ten years, as compiled by the canal officers at Albany, was as follows: 1885, 2,489,942 tons; 1886, 2,994,159; 1887, 3,088,244; 1888, 2,590,875; 1889, 3,003,246; 1890, 2,983,859; 1891, 2,461,695; 1892 2,271,021; 1893, 2,413,047; 1894, 2,622,486.

Notwithstanding the dull season, the traffic through the Portage lake canal this year has shown a decided increase over the corresponding period of last year. The large increase is due to the fact that the canal and Portage river entrances have been greatly improved, and now admit of vessels of much greater draft passing through. The Avon went out of the canal this season drawing 15 feet 1 inch and went up the river drawing 14 feet 9 inches.

One of Uncle Sam's most faithful servants, in Maine, but one that draws no salary, lives at the Portland Head lighthouse. This is a large gray parrot brought from Africa some time ago and presented to the keeper of the light. The bird soon noticed that when the fog began to blow in from the ocean somebody would cry out, "Fog coming in! Blow the horn!" One day the fog suddenly began to come in thick and no one noticed it, as they were all busy. Poll noticed this and croaked out, "Fog coming in! Blow the horn!" And now, whenever fog is perceptible, Poll never fails to give warning.

Illustrated Patent Record.

SELECTED ABSTRACTS OF SPECIFICATIONS OF A MARINE NATURE—FROM LATEST PATENT OFFICE REPORTS.

525 099. OAR-LOCK. George Garton, Millville, N. J., assignor of one-half to Harry Murphy, same place. Filed May 3, 1894. Serial No. 510,004.

Claim: In an oar-lock, the combination of the base plate having the pin W, the slotted cap K adapted to be secured to the base plate and the gunwale of a boat, with the oar-lock having horns *c*, flange P, stem Y, and base X, said base having a groove S adapted to receive the pin W, and said slotted cap adapted to receive the stem Y of the oar lock.

525,122. BOOM FOR HOLDING AND TOWING LOGS OR TIMBERS. Wesley F. Stevens, San Francisco, Cal. Filed Nov. 6, 1891. Serial No. 412,091.

Claim: The herein described boom consisting in a series of short longitudinally bored logs A, an endless chain extending through said bores, and a pair of transversely extending external stops *b b*, on the chain between the adjacent ends of every pair of logs; the said stops being adjustable on the chain crossing the bores of the logs and spacing the logs apart.

525,178. SUBMARINE TORPEDO BOAT. George C. Baker, Chicago, Ill.; Mary R. Baker, administratrix of said George C. Baker, decea ed. Original application filed March 14, 1893. Serial No. 465,983. Divided and this application filed Sept. 25, 1893. Renewed July 10, 1894. S rial No. 517,155.

Claim: First, in a submarine boat, and in combination with the smoke outlet of the furnace and with an opening in the shell provided with a seat, a vertically slidable smoke stack movable within said opening and having a cover for engagement with the seat when in a lowered position, openings in the stack adjacent to the cover, and a perforation in the lower portion of the stack adapted to register with the the smoke outlet when the stack is raised. Second, in a submarine boat, a furnace for generating steam therein, said furnace having a smoke pipe leading therefrom and terminating within the boat, and a smoke stack adapted to slide through an aperture in the shell of the boat and having its ends closed and its side wall perforated near its respective ends, the lower perforation adapted to register with the delivery end of the smoke pipe when in its raised position.

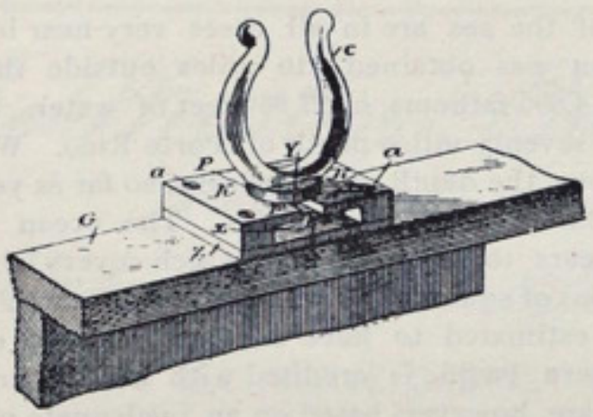
525,179. SUBMARINE TORPEDO BOAT. George C. Baker, Chicago, Ill.; Mary R. Baker administratrix of said George C. Baker, deceased. Original application filed March 14, 1893. Serial No. 465,983. Divided and this application filed Sept. 25, 1893. Renewed July 10, 1894, Serial No. 517,156.

Claim: The hull of a submarine boat substantially wedge shaped at bow and stern and whose vertical diameter is greater than its horizontal diameter taken through the same point, the outward longitudinal lines of the hull from bow to stern being substantially the same throughout the surface thereof, provided with adjustable propelling mechanism whereby the movement of the boat in any direction is controlled.

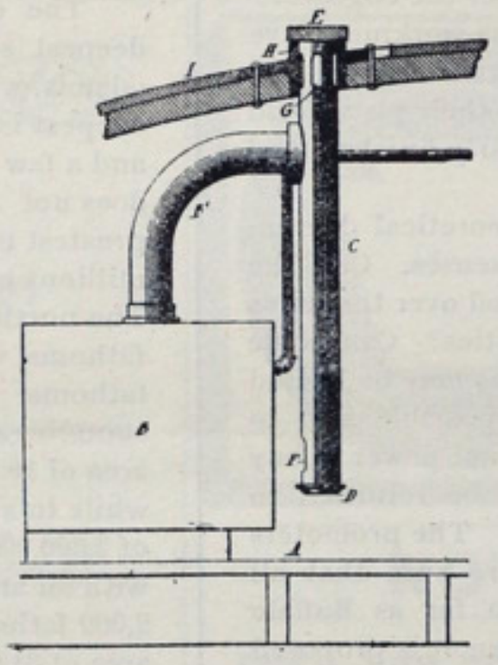
525,269. BOW-FACING OAR. Benjamin F. Kimsey, Terre Haute, Ind. Filed Oct. 27, 1893. Serial No. 489,332.

Claim: First, a propelling mechanism for small boats, comprising an oar formed in two sections, having gears at their adjacent ends held to mesh, a bearing member joining said gears, and a supporting guide secured to the boat, said bearing member being held on the said guide for a rocking movement and adapted to be moved laterally thereon. Second, as an improvement in propelling mechanisms for small boats, the combination with the laterally movable guide C, and the keeper G, of the connecting plate E, mounted to rock on such guide C, said plate having apertured projecting members *e'*, the bolts F held therein, gears *d d'* journaled on such bolts, and the oar sections D D' secured to such gears *d d'*.

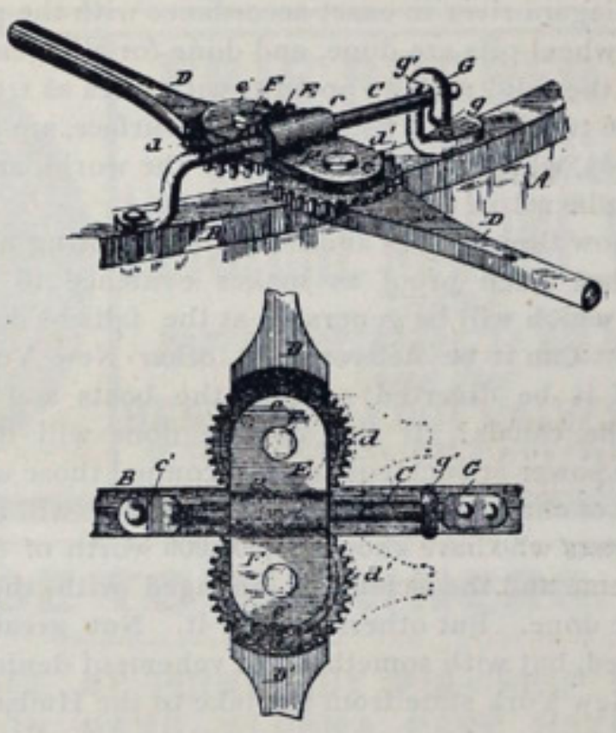
525,099. OAR-LOCK.



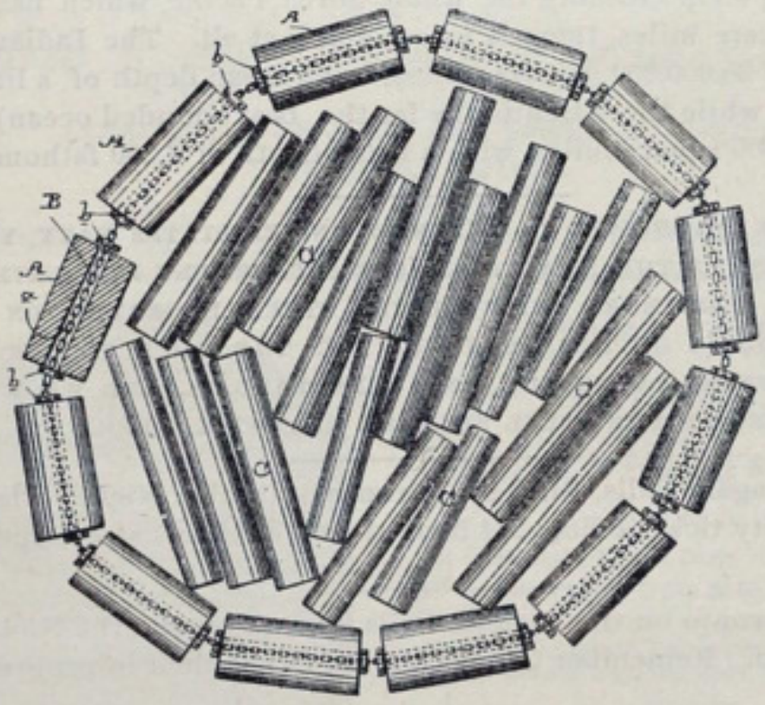
525,178. SUBMARINE TORPEDO-BOAT.



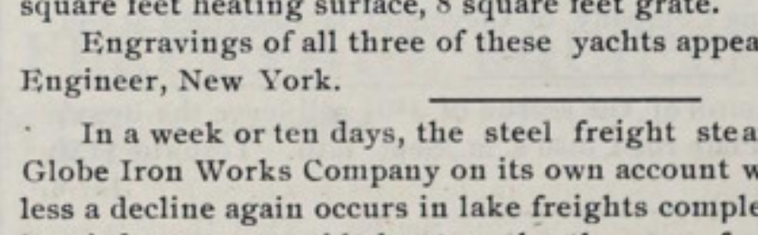
525,269. BOW-FACING OAR.



525,122. BOOM FOR HOLDING AND TOWING LOGS



525,179. SUBMARINE TORPEDO-BOAT.



Three Fastest Steam Yachts Known.

The three swiftest steam yachts known, the Fiseen, Norwood and Buzz, were designed and built within the past few years, by Charles D. Mosher of New York. Of course, the boats were racers, pure and simple, one of them being built wholly for the purpose of testing theories as to what a fast boat should be, and none of them being of any practical use from a commercial standpoint. As all of these boats have attested records as to speed from persons entirely uninterested in them, the following particulars regarding each will be of interest:

Fiseen—Speed 31.6 miles per hour; 85 feet long, 9 feet 8 inches beam, 42 inches draught; quadruple engines of 600 horse power at 600 revolutions; cylinders, 9.5, 13.5, 18 and 24 inches by 10 inches stroke; boiler of Mosher water tube type, 1,200 square feet heating surface, 33 square feet grate and worked at 275 pounds pressure.

Norwood—Speed 30.5 miles per hour; 63 feet long, 7 feet 3 inches beam, 36 inches draught; triple expansion engines of 450 horse power, at about 560 revolutions; cylinders, 9, 14½ and 22 inches by 9 inches stroke; boiler of Mosher water tube type, 800 square feet heating surface, 24 square feet grate.

Buzz—Speed 29.6 miles per hour; 50 feet long, 6 feet 6 inches beam, two non-condensing engines of 194 horse power at 772 revolutions with 150 pounds of steam; cylinders 8 by 8 inches; boiler of locomotive type, 300 square feet heating surface, 8 square feet grate.

Engravings of all three of these yachts appear in the last issue of the Engineer, New York.

In a week or ten days, the steel freight steamer being built by the Globe Iron Works Company on its own account will be launched, and unless a decline again occurs in lake freights completion of the ship will be hurried, so as to enable her to make three or four trips this fall. This boat is fitted for package freight business and is undoubtedly the staunchest ship ever constructed by the Globe company. Her two boilers are the largest as yet built in this part of the country.

Opening of Niagara Falls' Power Plant.

Some time in October the great power plant at Niagara Falls, on which Pierpont Morgan, Dr. Coleman Sellers, Lord Kelvin and other capitalists have expended $5,000,000, is to be started, with great ceremony, and it is expected that electric power equal to 20,000 horse power will be immediately transmitted to Buffalo. A great deal is being written about this enterprise, now that the time for a trial of a part of the plant is near at hand. The New York correspondent of the Philadelphia Press says in a recent letter on the subject:

"It has been estimated that the city of Buffalo makes use of some 50,000 horse power daily to supply all her commercial needs. If, then, when the test is made in October, it is found that the plans of the engineers are justified by works, Buffalo will receive from Niagara Falls an amount of power equal to nearly one-half of all that is necessary to run her mills and propel her street cars. But Buffalo is only a part of the field. The capacity of the entire plant at Niagara is 50,000 horse power in the form of electricity, and 50,000 horse power transformed from the waterfall directly into force to be used in mills along the bank of the river. This water power plant is of course a local affair. Future operations of the company with the 50,000 horse power credited to the electric plant, which is the limit according to present plans, will depend upon the outcome of the test in October with 20,000 horse power. If the test is a success, then, instead of three turbines and three dynamos, as at present, there are to be ten of each.

"This work at Niagara is spoken of as experimental, and so, in perhaps the most important sense, it is. But it is no longer an experiment of mechanical construction. The inlet canal is built and receives the water from the Niagara river in exact accordance with the plans of the engineers. The great wheel pits are done, and done for all ages. The workmen have cut out of the solid rock an opening with lines as true as those of a mighty shaft. The turbines, 200 feet below the surface, are set in their places, and the dynamos, which are the largest in the world, are nearly finished and are soon to be set in their places."

"But now there comes another thing awaiting not theoretical demonstration, but such proof as makes evidence to the senses. Can the electricity which will be generated at the falls be delivered over the wires to Buffalo? Can it be delivered to other New York cities? Can some portion of it be diverted so that the boats and barges may be hauled through the canals? If this can be done will it be possible also to deliver the power at such cost as will compel those who want power to buy it, because of cheapness, and at the same time will profit be returned to the capitalists who have shown $5,000,000 worth of faith? The promoters of the scheme and the scientists engaged with them are sure that all this can be done. But others doubt it. Not greatly so far as Buffalo is concerned, but with something of vehement denial when it is proposed to bisect New York state from the lake to the Hudson with the power carrying wires.

Many others besides those directly interested in this plant are awaiting the day of the experiment. If it be possible to create at a great natural power like Niagara a plant that can utilize this power so that the wheels of many mills may be turned, and the streets and houses of many towns be lighted, and if in addition to that it is also possible with some portion of this power to propel the boats and barges which swim the canals, then it will be possible to make such use of water power in other sections, and also in like manner to set up powerful electric plants by the sides of the exhaustless coal mines. It has been estimated that there is water power in New Jersey sufficient to generate all the electricity needed for the flourishing manufacturing cities within fifty miles of New York."

Trade Notes.

Williamson Brothers of Philadelphia are constructing steering gear for the new American Line ships St Louis and St. Paul.

Another wooden steamer for the International Steamship Company will be built by the New England Ship Building Company of Bath, Me.

The steam shovel at the Mountain Iron mine, Mesabi range, which, as noted in the REVIEW last week, loaded 143 cars of iron ore in ten hours, was built by the Vulcan Iron Works Company of Toledo.

In the September number of the American Engineer and Railroad Journal of New York, the traveling crane in use at the ship yard of F. W. Wheeler & Co., West Bay City, and which was built by the Brown Hoisting and Conveying Machine Company of Cleveland, is described at considerable length.

LAST NIAGARA EXCURSION of the season of 1894 will leave the Broadway station of the Nickel Plate road, 5:30 a. m., Sept. 12th. Toronto, $1.00 extra. 147-6

A DAYLIGHT EXCURSION leaves Cleveland via the Nickel Plate road, 5:30 a. m., Sept. 12th, for Niagara Falls. $3.00 for the round trip. Toronto, $1.00 extra. At 224 Bank street, 534 Pearl street, or depots you may purchase tickets. 148-6

Publications.

The third number for 1894 of the Journal of the American Society of Naval Engineers (quarterly) is at hand. The journal is now edited by Passed Assistant Engineer R. S. Griffin. Among the leading original articles in the current issue are the following: "Review and Experimental test of the Steam Plant of the S. S. Iroquois," by W. C. Seldon, Esq., member of the society; a description of the twin-screw steamer Albatross belonging to the United States Commission of Fish and Fisheries, by Chief Engineer Isherwood, U. S. N.; "Air Pumps," by Passed Assistant Engineer F. H. Bailey, U. S. N.; a collection of trial data from a large number of steamships, by J. M. Lincoln, Esq., associate.

Vandergrift's United States Tariff, 1894, is a handy volume of 550 pages, giving full information of customs duties up to date and revised according to the results of the latest tariff legislation. Full instructions for exporting and importing are given and each dutiable article is mentioned separately and in alphabetical order. A copy may be had at a small price by addressing F. B. Vandergrift & Co, 27 William street, New York, N. Y.

No. 4, Vol. 1, of the naval militia and yachtsman's journal, Burgee and Penant, has been received in its finely illuminated cover. It is the neatest marine paper, typographically, that has yet been published and seems to cover very well the field which it claims. It is published weekly and the subscription price is $4 per year. If you wish to see a sample copy or subscribe for the paper, address Burgee and Penant, 14 Madison Square, South, New York, N. Y.

Areas and Depths of Oceans.

The deepest parts of the sea are in all cases very near land. The deepest sounding known was obtained 110 miles outside the Kurile islands, where there are 4,655 fathoms, or 27,930 feet of water. The next deepest is 4,561 fathoms, seventy miles north of Porto Rico. With these and a few other exceptions, the depth of the oceans, so far as yet known, does not reach 4,000 fathoms, or four sea miles. The ocean with the greatest mean depth appears to be the Pacific, which covers sixty-seven millions of the 188 millions of square miles composing the earth's surface. The northern Pacific is estimated to have a mean depth of over 2,500 fathoms, while the southern Pacific is credited with a little under 2,400 fathoms. These figures are, however, based on an inadequate number of soundings. Thus in the eastern part of the central Pacific there is an area of 10,500,000 square miles, in which there are only seven soundings, while in a long strip crossing the whole north Pacific, which has an area of 2,800,000 square miles, there is no sounding at all. The Indian Ocean, with an area of 25,000,000 square miles, has a mean depth of a little over 2,000 fathoms, while the Atlantic (by far the best sounded ocean) has an area of 31,000,000 square miles, with a mean depth of 2,200 fathoms.

IF YOU ARE INTERESTED IN THE NEW UNITED STATES NAVY, YOU WILL WANT PICTURES OF THE NEW YORK, (SEE SUPPLEMENT IN A LATE ISSUE.) PHILADELPHIA, BALTIMORE AND VESUVIUS, STEEL ENGRAVED ON HEAVY CARD BOARD 10x14 INCHES. SEND $1 FOR THE FOUR TO THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING, CLEVELAND, O., AND WE WILL ADD A COLOR ETCHING OF THE STEEL STEAMER GRATWICK, FREE.

$3.00 to Niagara Falls, $4.00 to Toronto, via the Nickel Plate road, Sept. 12th. City ticket offices 224 Bank street, 534 Pearl street and depots. 145-6

$4.00 to Toronto on the Niagara Falls excursion via the Nickel Plate road, Sept. 12th. Remember Canada's great fair is then in progress. 146-6

U. S. ENGINEER OFFICE, Burlington, Vt., September 5, 1894.—Sealed proposals in triplicate, for dredging in Ogdensburg Harbor, N. Y., will be received here until 2 p. m., October 5, 1894, and then publicly opened. Full information furnished on application to Smith S. Leach, Capt. Engineers. 27

U. S. ENGINEER OFFICE, Burlington, Vt., September 5, 1894.—Sealed proposals in triplicate, for rock excavation in Otter Creek, Vt., will be received here until 2 p. m., October 5, 1894, and then publicly opened. Full information furnished on application to Smith S. Leach, Capt. Engineers. 27

U. S. ENGINEER OFFICE, Burlington, Vt., September 5, 1894.—Sealed proposals in triplicate, for dredging in Great Chazy River, N. Y., will be received here uutil 2 p m., October 5, 1894, and then publicly opened. Full information furnished on application to Smith S. Leach, Capt Engineers. 27

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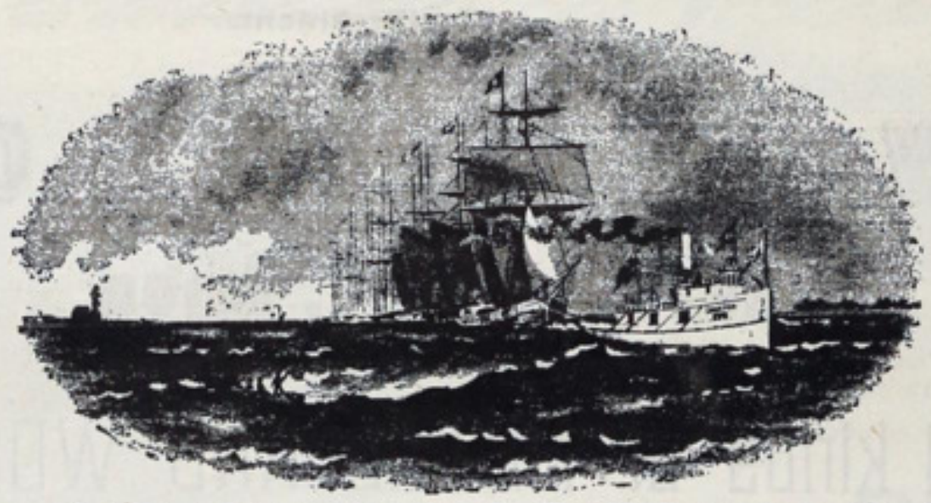

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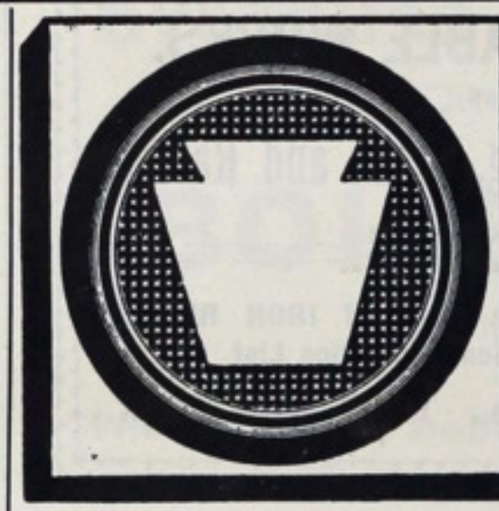

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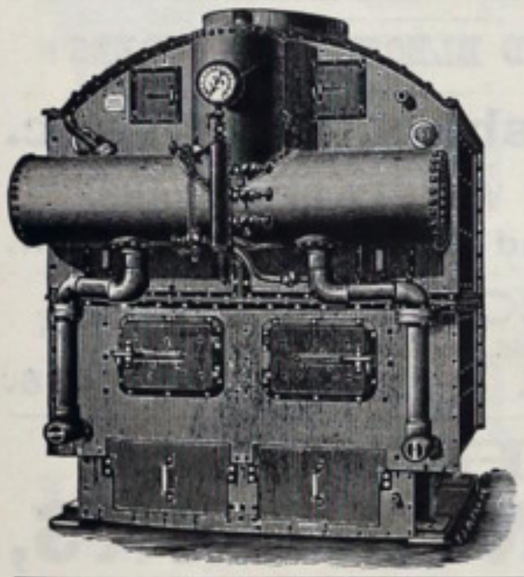

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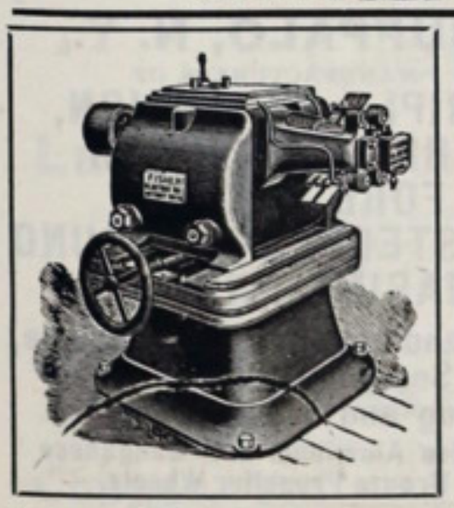

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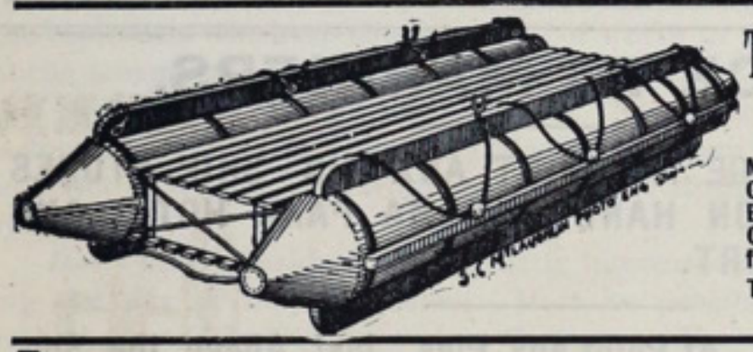

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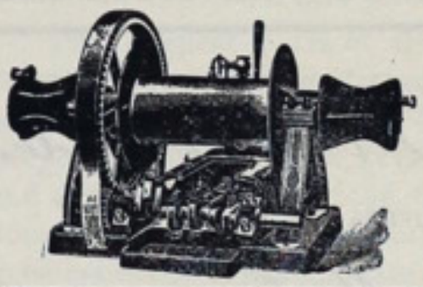

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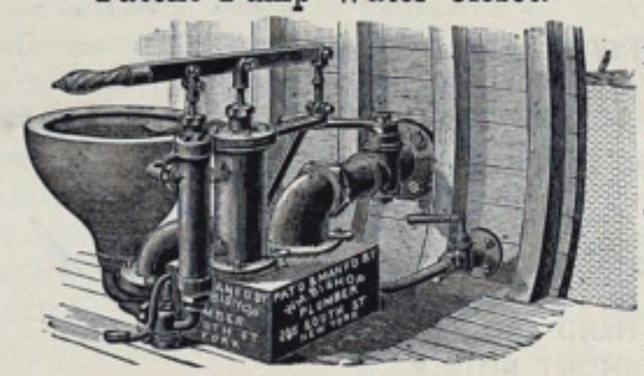

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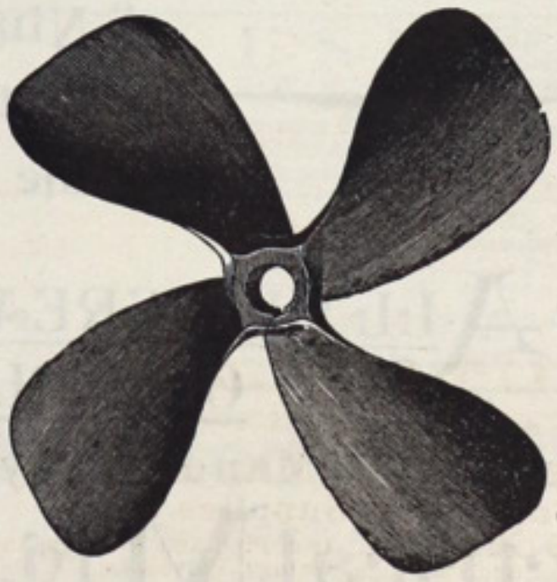

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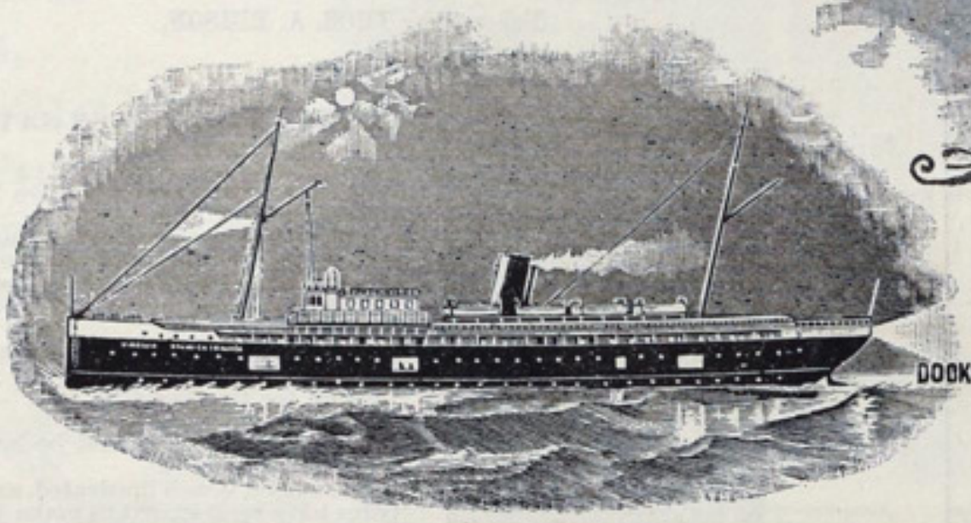

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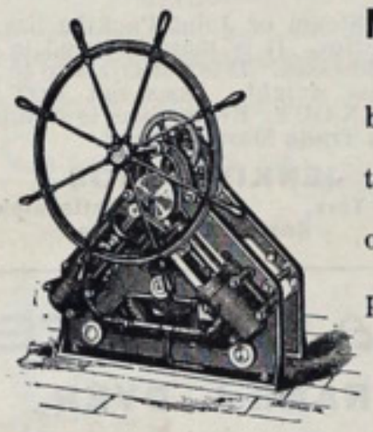

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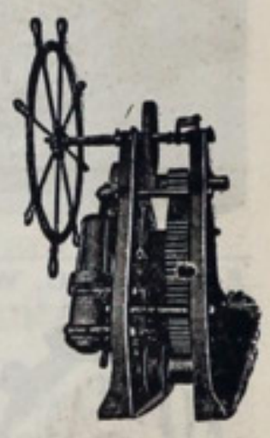

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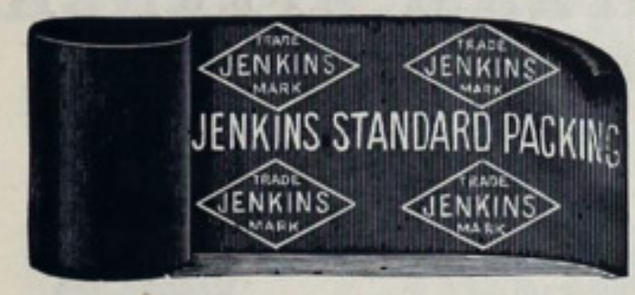

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References: American Steel Barge Co.; Capt. Alexander McDougall.

U. S. ENGINEER OFFICE, 34 West Congress St., Detroit, Mich., August 23, 1894. Sealed proposals for furnishing all labor, materials, and appliances, and removing a shoal of bed rock and other material from Sec. 8, Ship Channel between Chicago, Duluth and Buffalo, will be received here until 2 p. m., standard time, September 22, 1894, and then publicly opened. All information furnished on application. O. M. POE.
Sept. 14 Col. Corps of Engineers.

U. S. ENGINEER OFFICE, Burlington, Vt., September 5, 1894.—Sealed proposals in triplicate, for repairs to Burlington Breakwater, Vt., will be received here until 2 p. m., October 5, 1894, and then publicly opened. Full information furnished on application to Smith S. Leach, Capt. Engineers, 27

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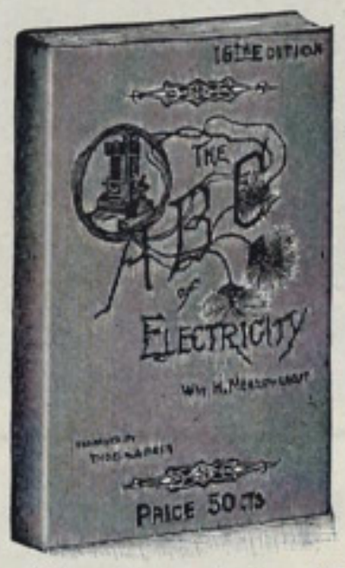

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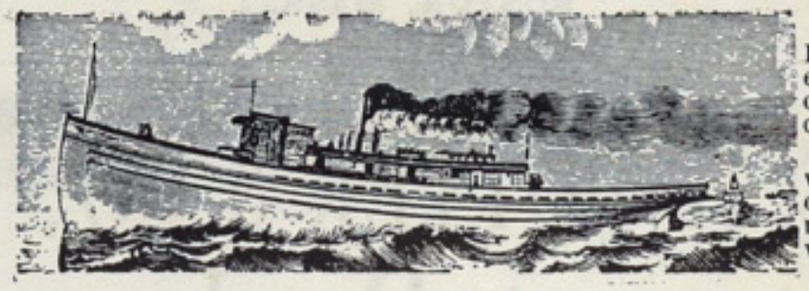

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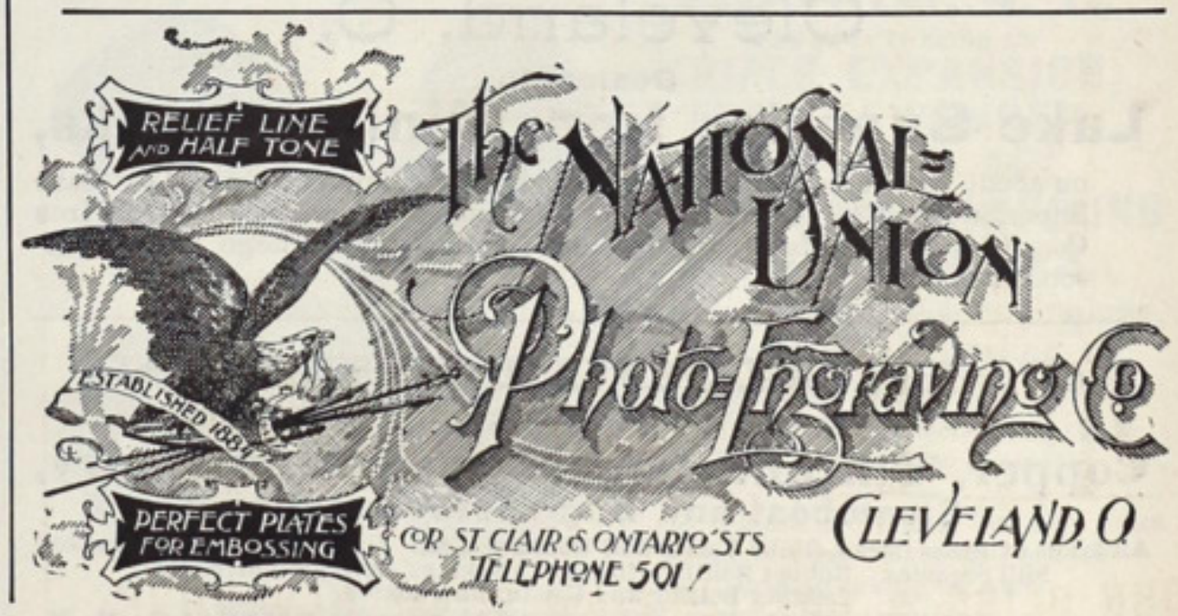

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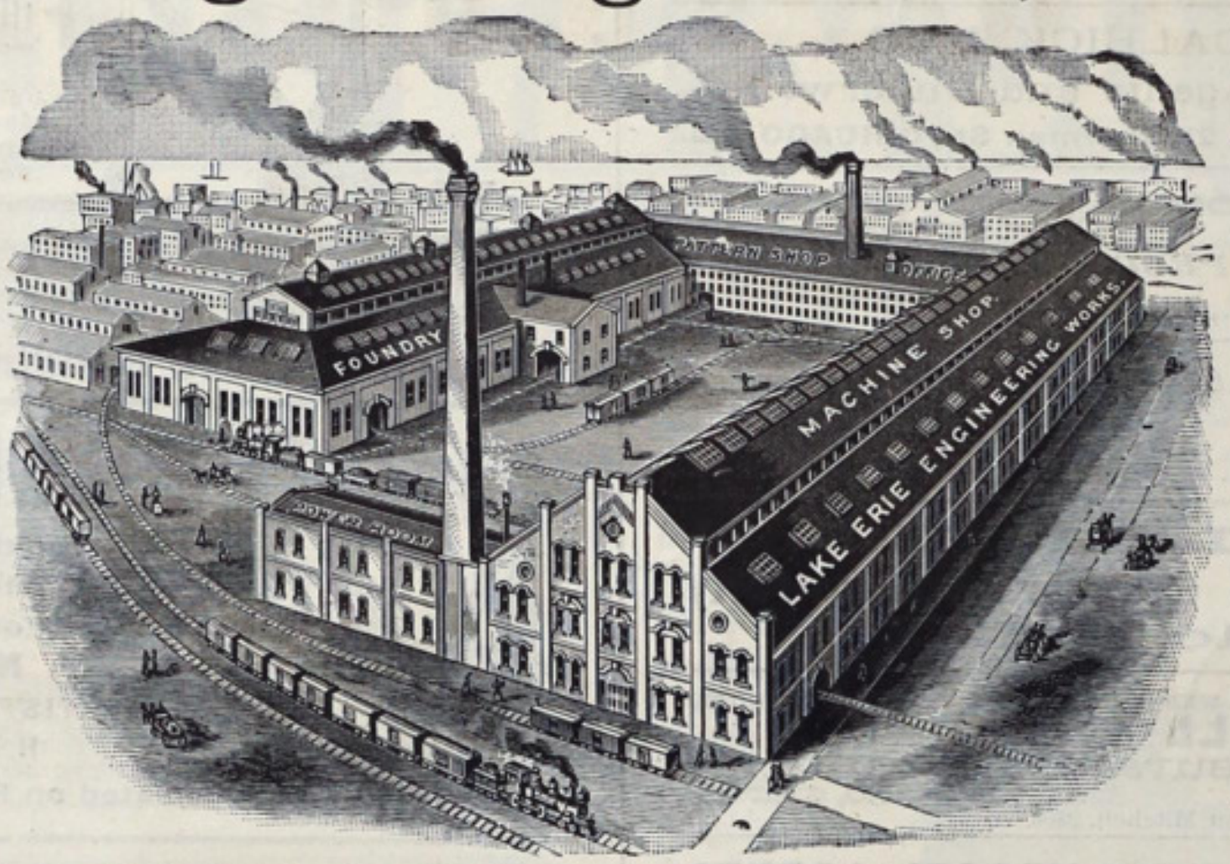

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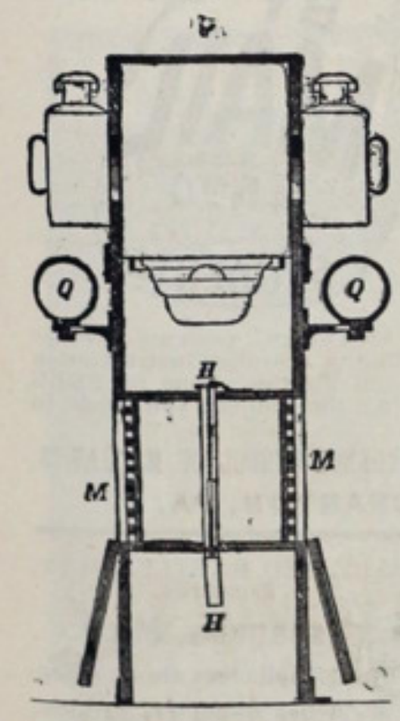

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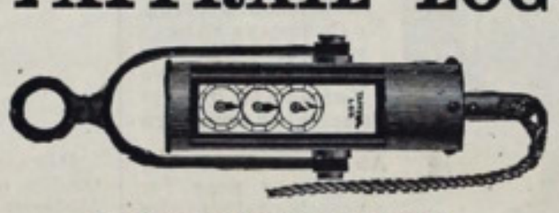

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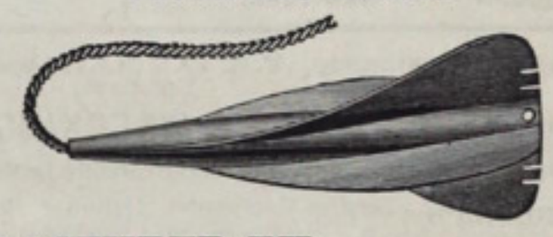

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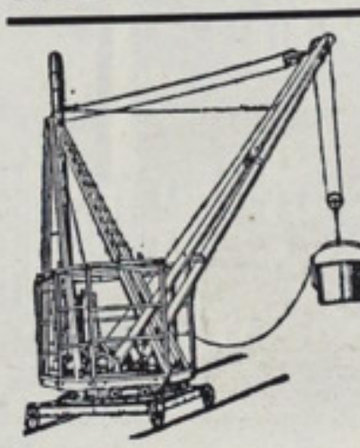
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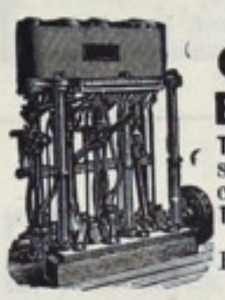
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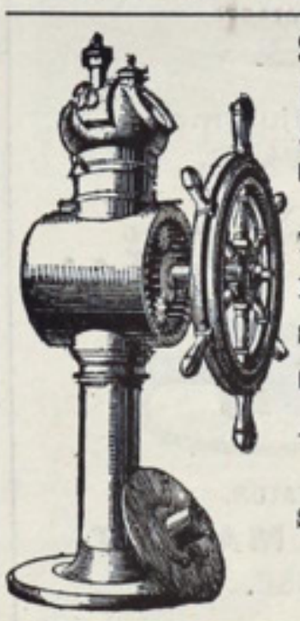
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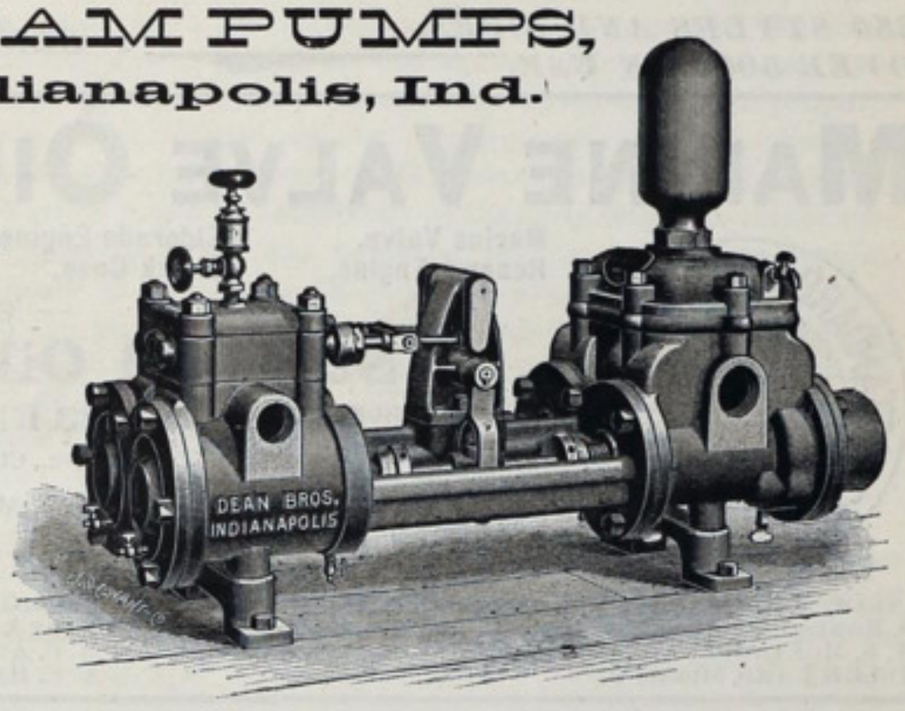

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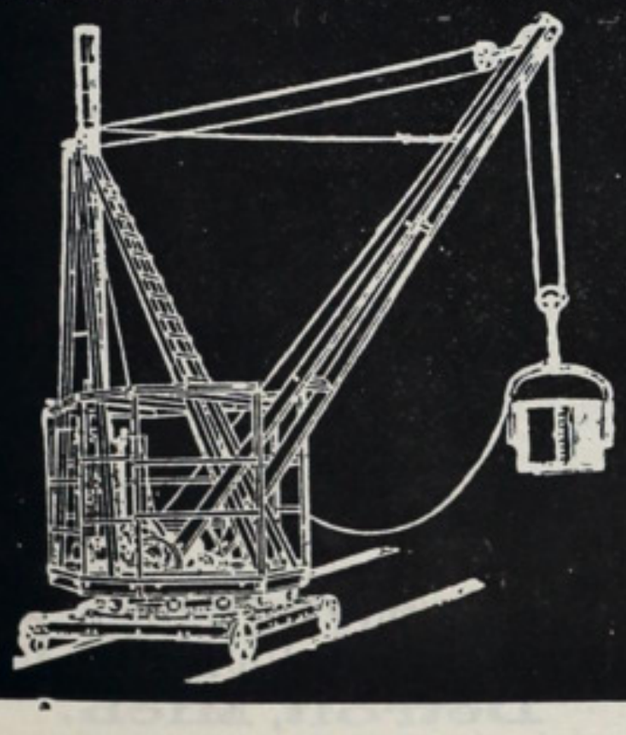

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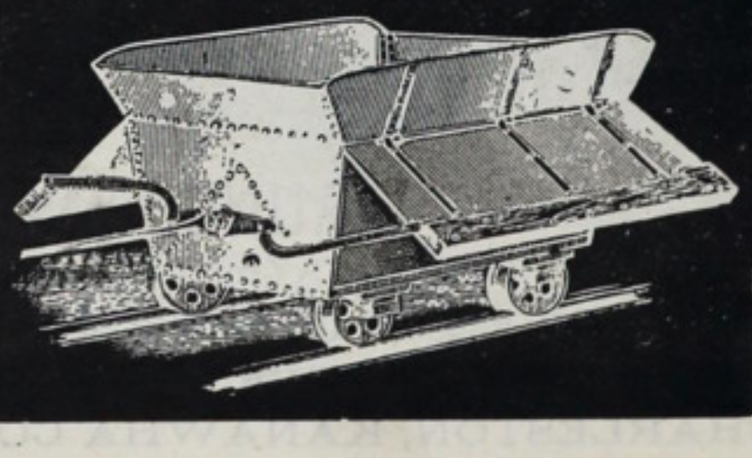

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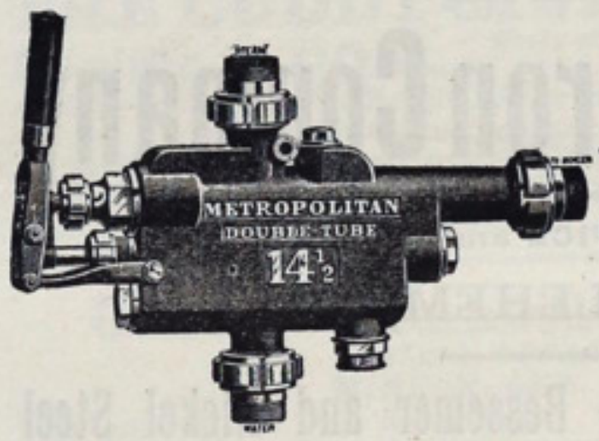

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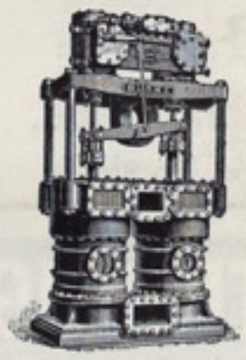

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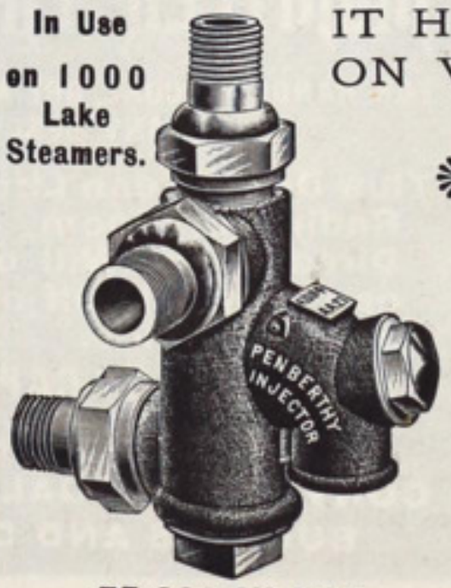

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